Session 4 | Whisky/whiskey

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An overview of spirits production

raw material

spirit

1. processing the raw material
   to create a sugary liquid
2. alcoholic fermentation
   to create ethanol and congeners
3. distillation
   to select and concentrate ethanol and some congeners
4. post-distillation operations
   to adjust colour, aroma, sweetness and alcoholic strength

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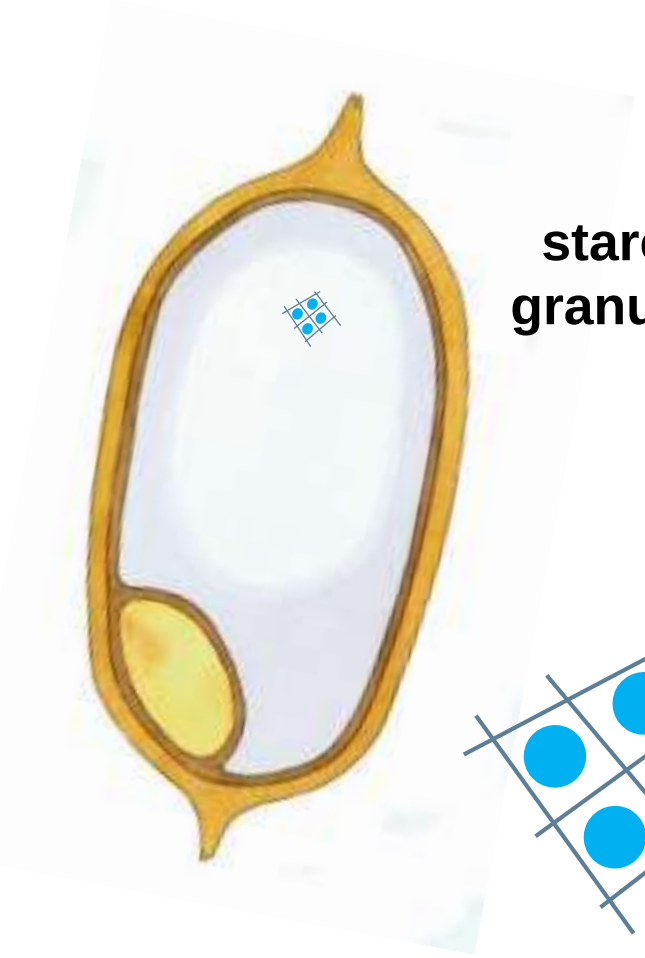
Raw material

Grains

- barley
- corn
- rye
- wheat

Processing starch



starch granules

unpack the starch granules

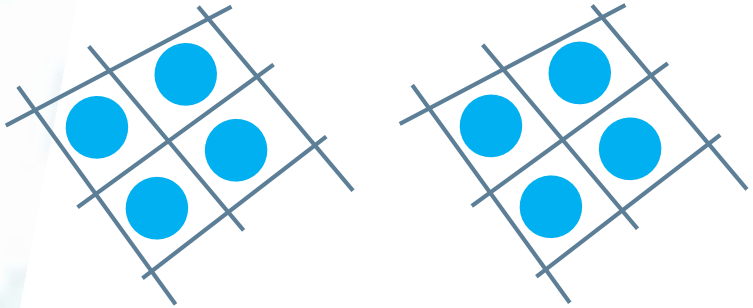
- malting
- cooking

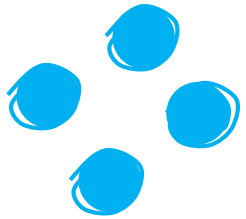
unroll the starch and dissolve it in water

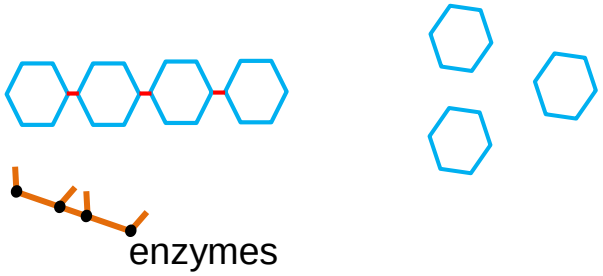
- heat and water

enzymes convert the starch to sugar

glucose







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Malting barley

Grain grows

- warm, damp conditions

Growth stopped

- hot air

After malting

- starch granules unpacked
- enzymes released

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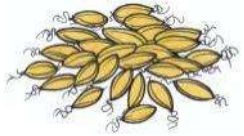
Whisk(e)y basics

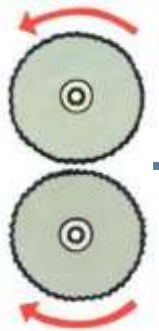
processing the raw material & fermentation

starch unpacked
enzymes released

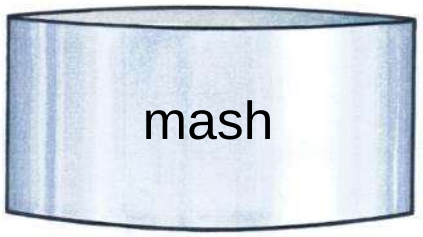
malted barley



crush



warm water



barley starch unrolled and dissolved
starch to sugar conversion

sugary liquid

❶

❷

add | yeast

alcoholic liquid

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Cooking grains

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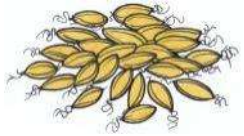
Whisk(e)y basics

processing the raw material & fermentation

enzymes and unpacked starch

malted barley



crush

unmalted grains

crush

starch unpacked, unrolled and dissolved

cook in hot water

NO enzymes

mash

barley starch unrolled and dissolved
all the starch converted to sugar

bought-in enzymes
(optional where permitted)

sugary liquid

❶

❷

add yeast

alcoholic liquid

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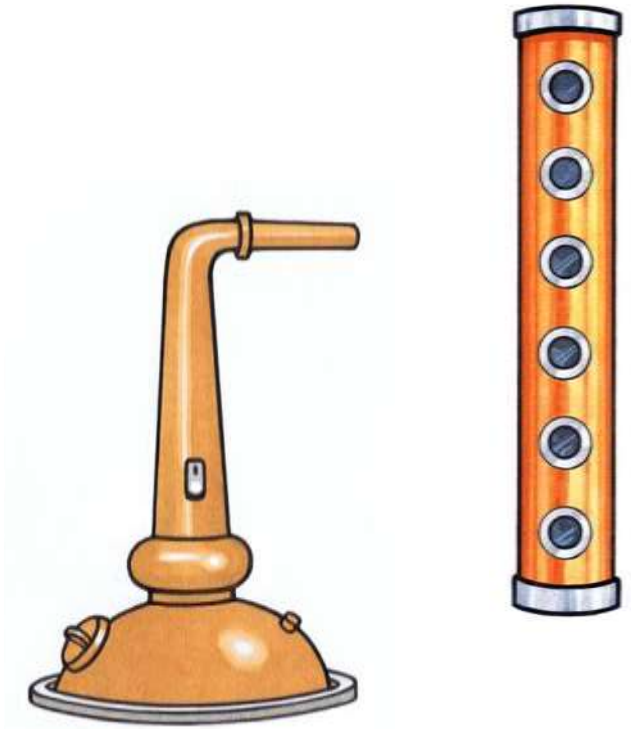
Whisk(e)y basics

distillation and post-distillation

3 4



pot stills or column stills

choices often determined by local laws

oak barrels

caramel colour (*optional*)

blending and dilution (*typical*)

whisk(e)y

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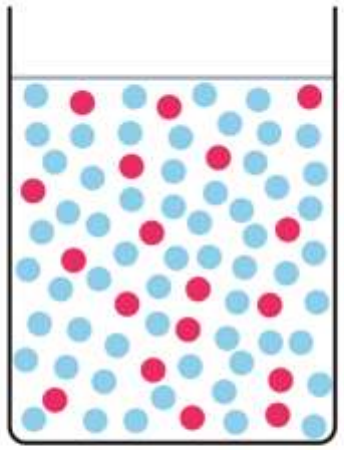
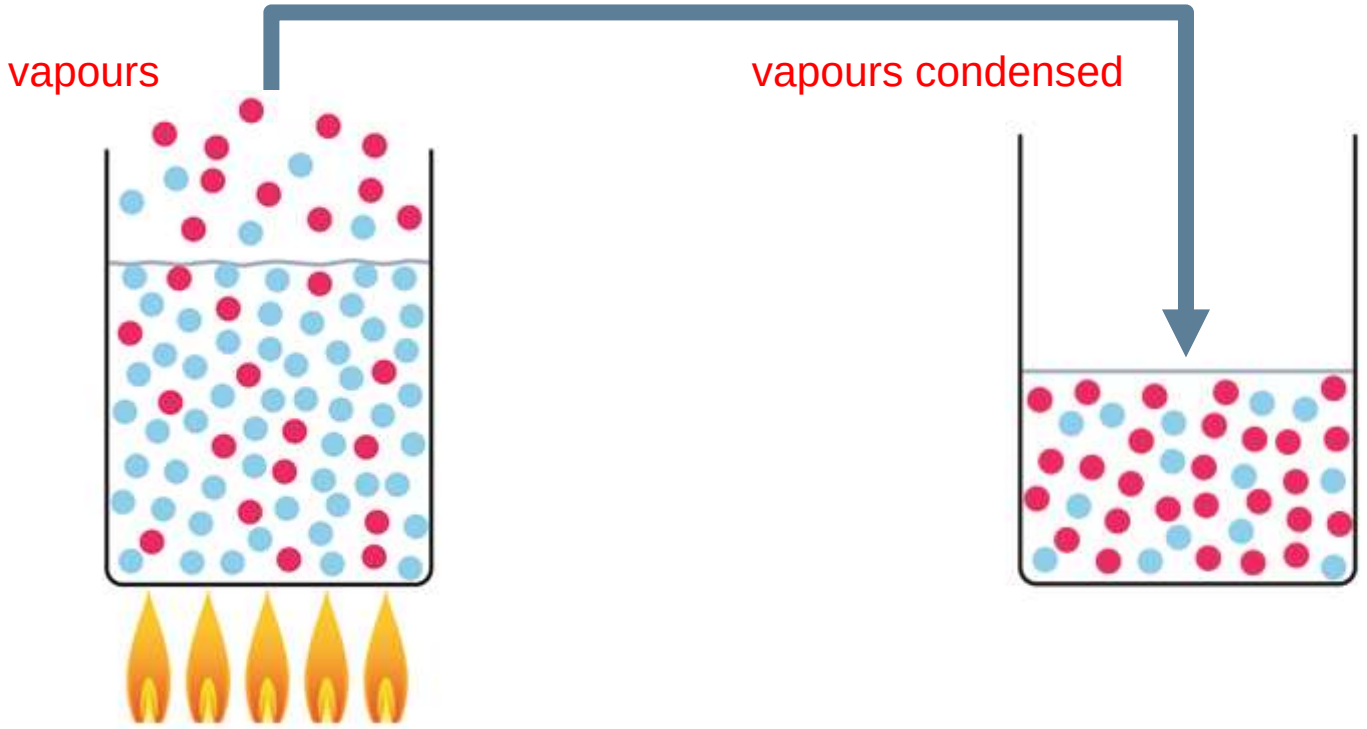
The theory of distillation

water/ethanol mix



Volatility

- water 100°C
- ethanol 78.3°C



Boil & vapourise

- higher concentration of ethanol in the vapours

Condense

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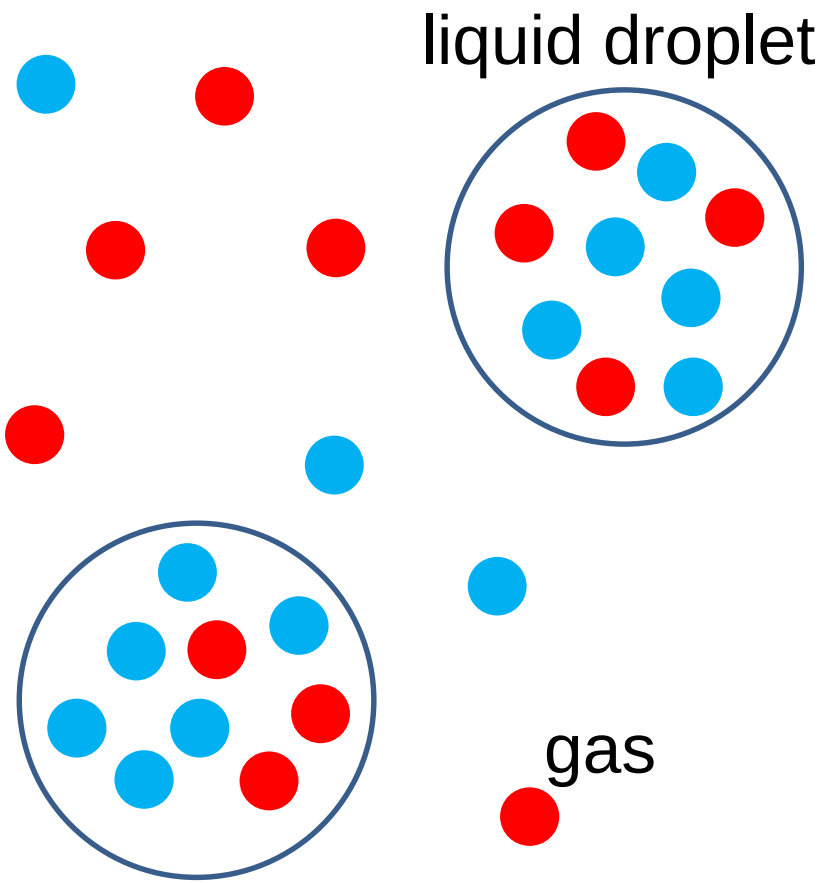
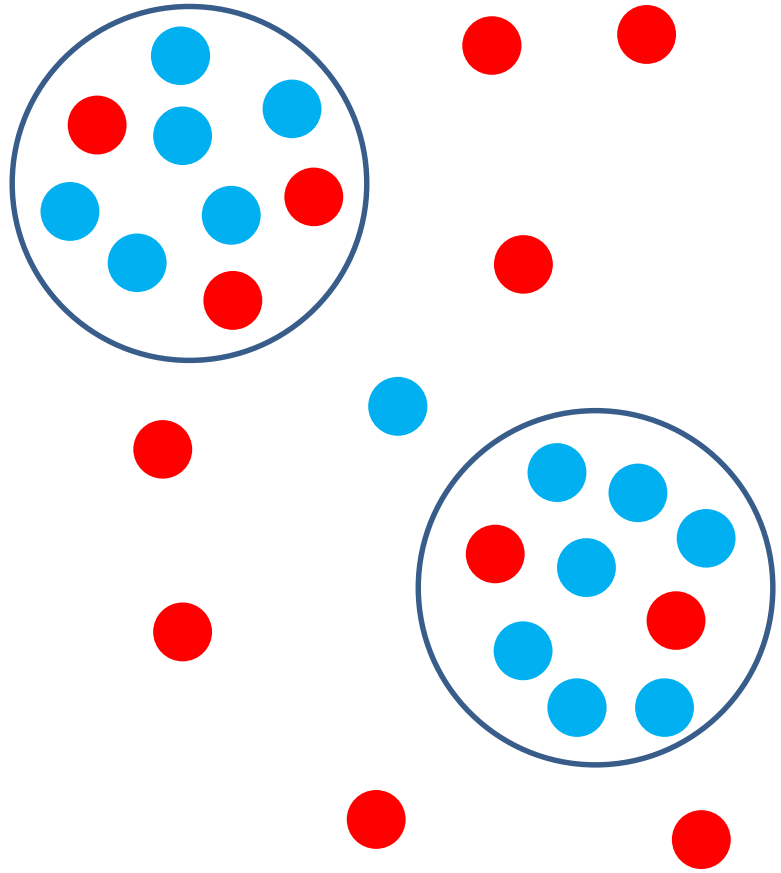
Reflux and rectification

water/ethanol mix

Before



After



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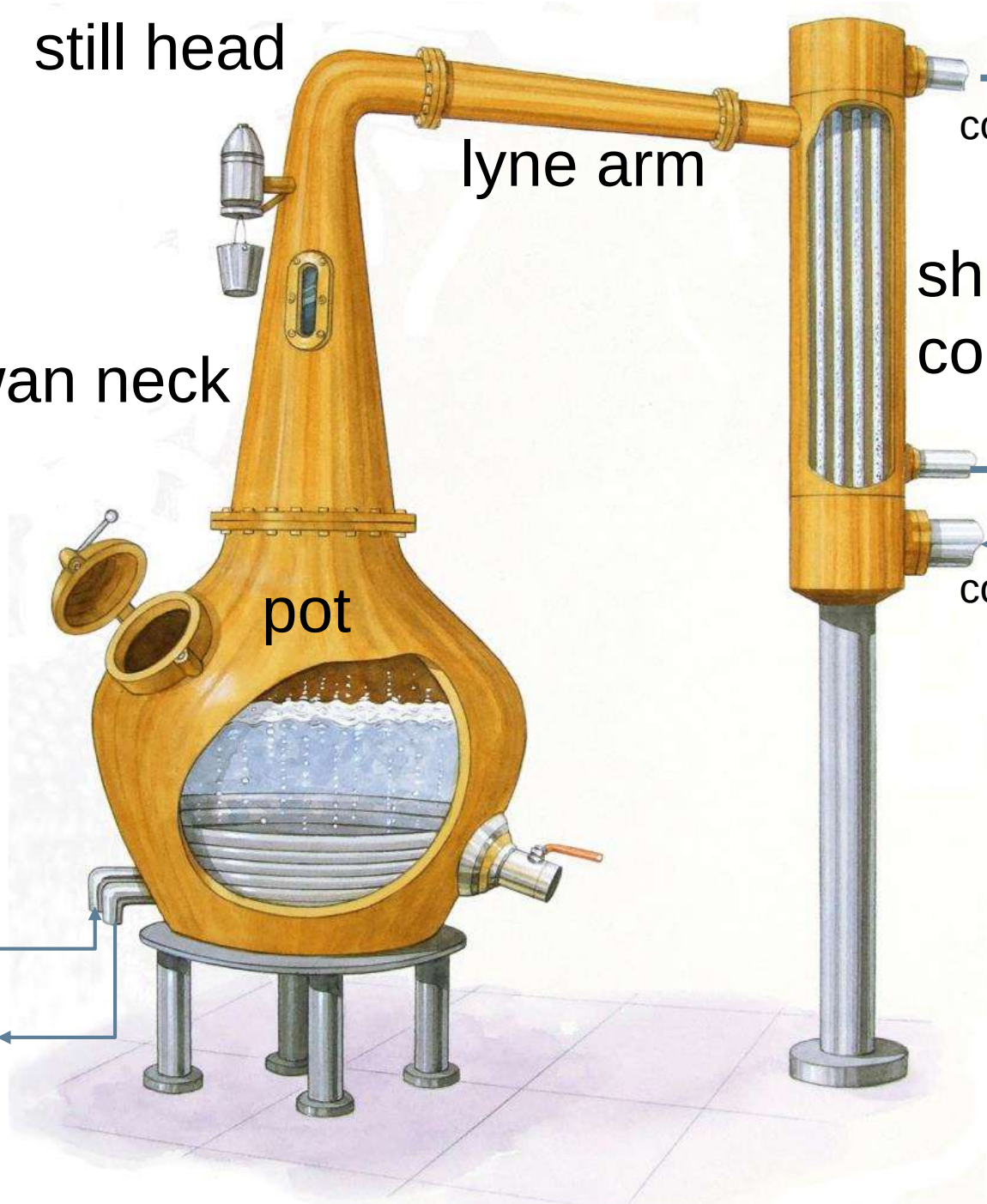
Pot stills



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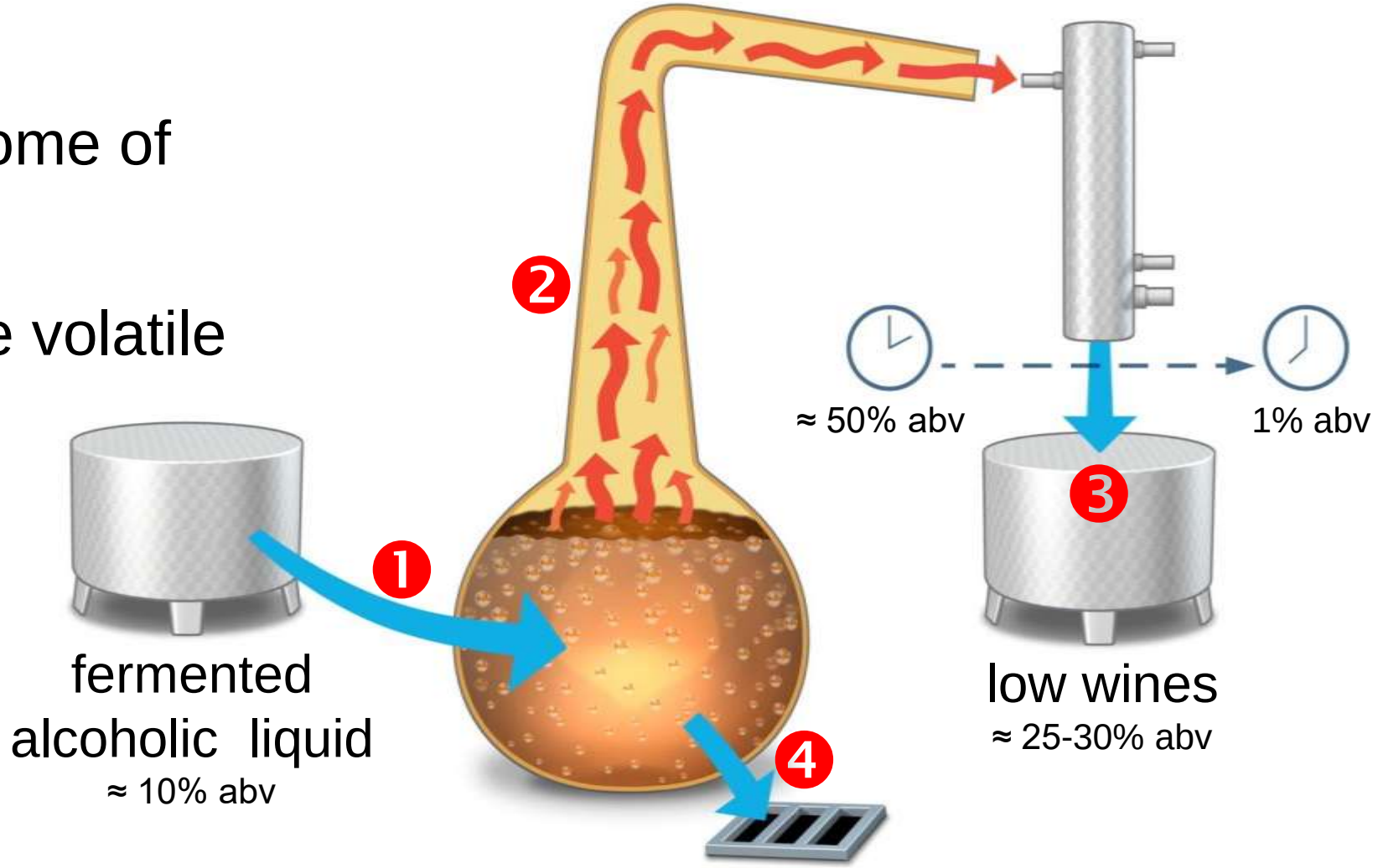
Double pot still distillation

1st distillation

Aim

- to remove some of the water
- collect all the volatile fractions

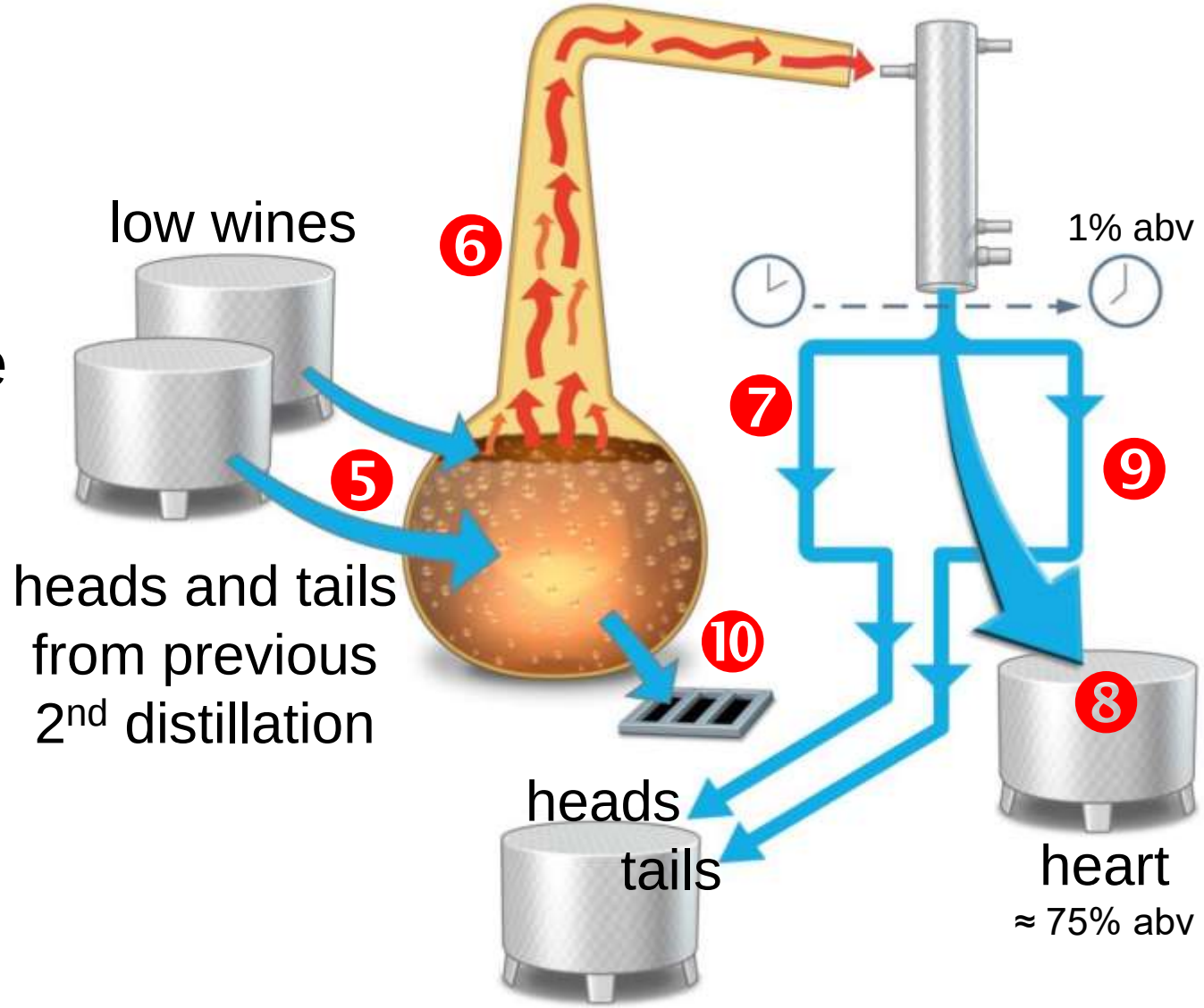


Double pot still distillation

2nd distillation

Aim

- to create a usable spirit
- select and concentrate ethanol and some congeners



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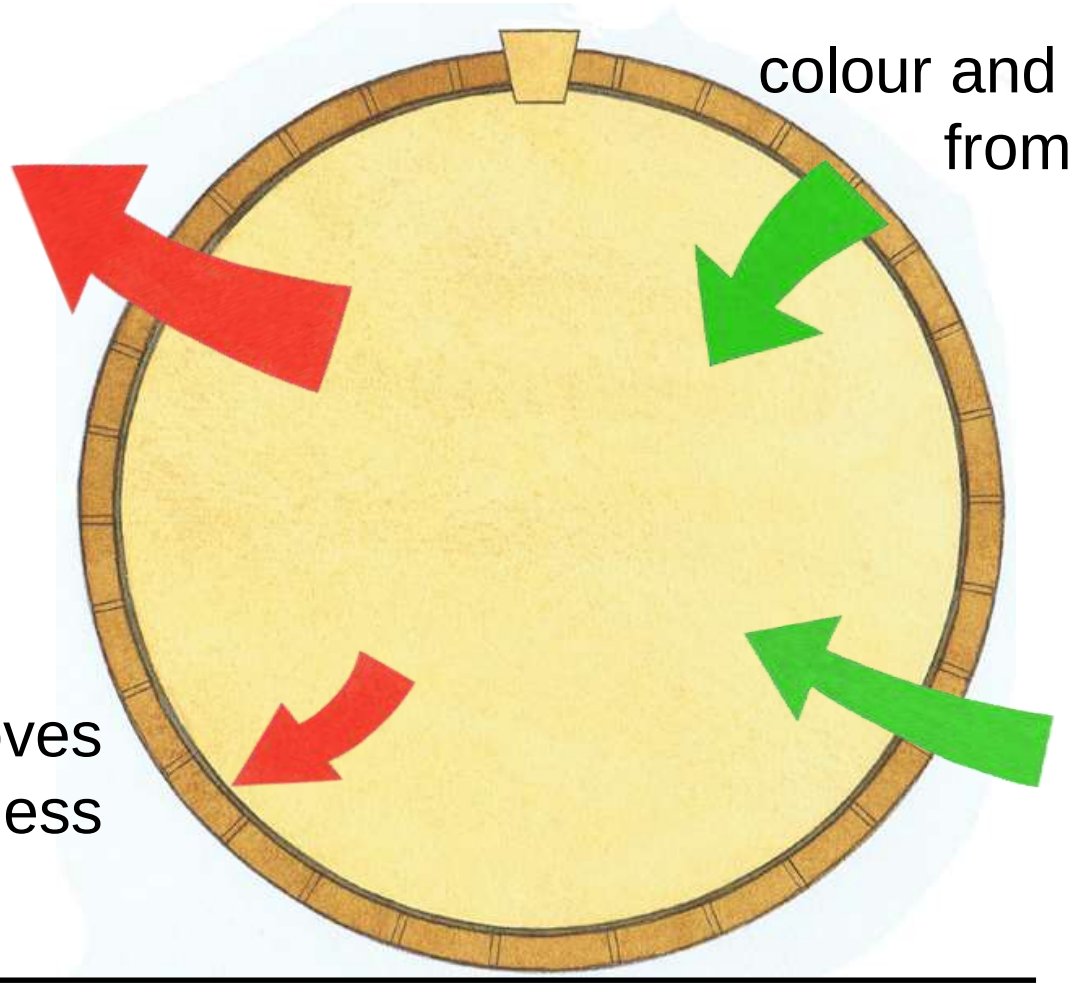
Post-distillation operations

fundamentals of oak maturation



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Post-distillation operations

oak maturation choices

Barrel age

- new oak barrel
- old oak barrel

Previous contents

- wood finishing

Temperature

- hot or cool

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Post-distillation operations

blending, caramel colour, chill-filtration

Blending

- batch consistency
- complexity

Caramel colour

- batch consistency

Chill-filtration

- prevents haze

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USA

50°N
40°N
30°N
Canada
Vancouver
Toronto
New York
Washington DC
USA
San Francisco
Los Angeles
Kentucky
Tennessee
Mexico
NORTH AMERICA
N

Bourbon

raw materials and fermentation

Grains

- mash bill
- minimum 51% corn
- rye, wheat, malted barley

Fermentation

- selected yeast

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Bourbon

distillation and post-distillation operations

Distillation

- low strength using column stills

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Bourbon

distillation and post-distillation operations

Distillation

- low strength using column stills

Maturation

- new charred oak barrels

Finishing

- blending options

  mash bill, warehouse floor, age

- only water can be added

  caramel colour and sugar not permitted

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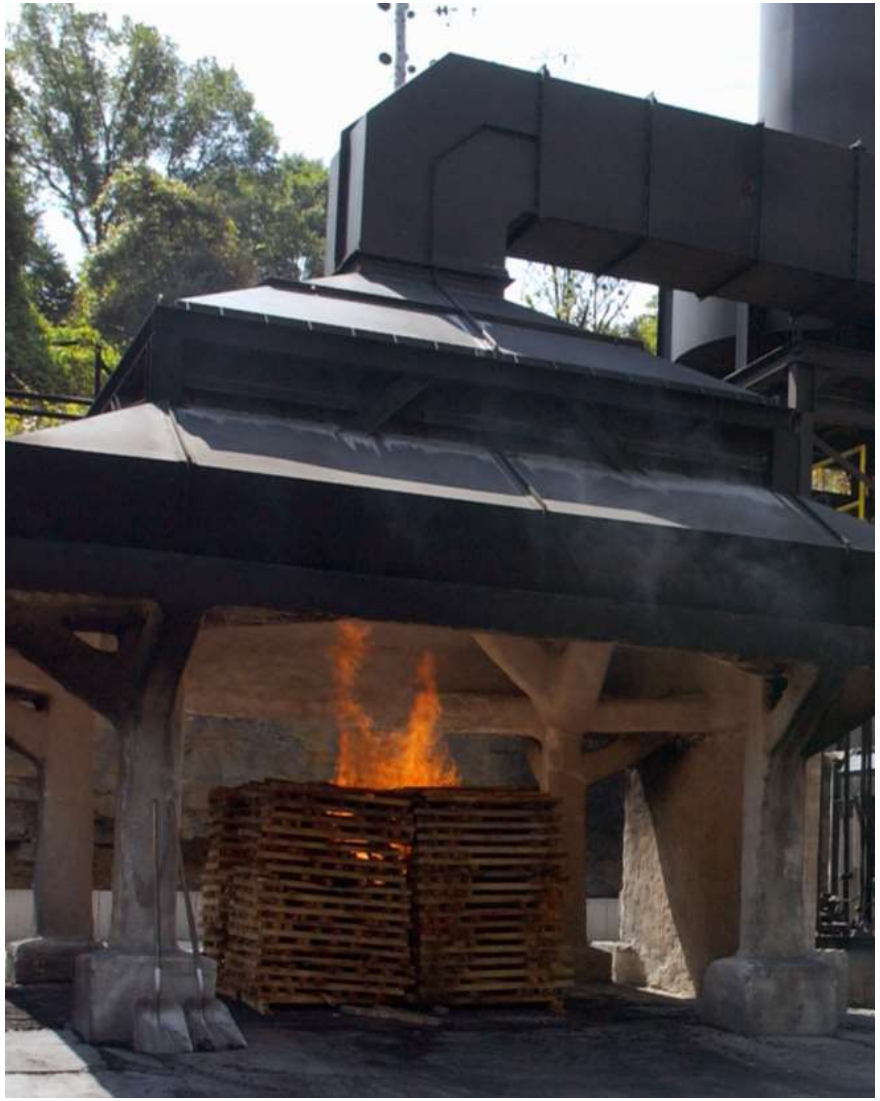
Tennessee Whiskey



Grains and fermentation

- corn (51%), rye, wheat, malted barley, selected yeast

Distillation

- low strength using column stills

Maturation

- charcoal filtered (Lincoln County Process)
- new charred oak barrels

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Rye Whiskey

Grains and fermentation

- rye (51%), corn, wheat, malted barley, selected yeast

Distillation

- low strength using column stills

Maturation

- new charred oak barrels

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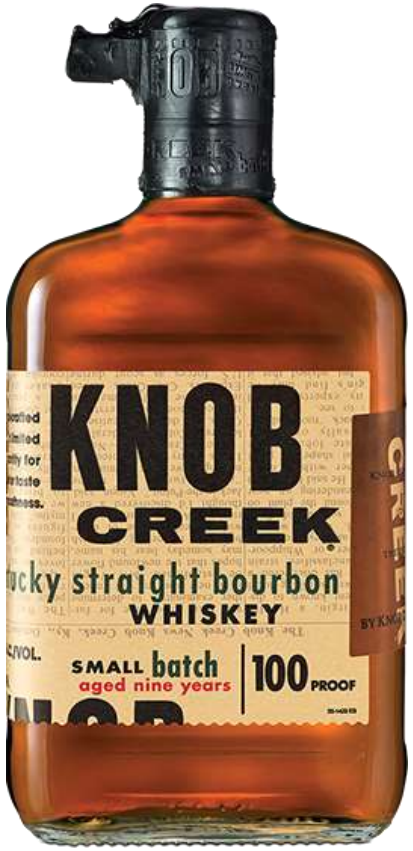
Labelling Terms

straight



small batch
single barrel
age statement

bottled in bond

sour mash

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APPEARANCE		
Clarity		clear – hazy
Intensity		water-white – pale – medium – deep – opaque
Colour		colourless – lemon – gold – amber – brown pink – red – orange – yellow – green – blue – purple – brown – black
Other observations		e.g. louching
NOSE		
Condition		clean – unclean
Intensity		neutral – light – medium – pronounced
Aroma characteristics		e.g. raw material, processing, oak and maturation
PALATE		
Sweetness (sugar level)		dry – off-dry – medium – sweet
Texture		e.g. rough, smooth, watery, mouthfilling, warming
Flavour intensity		neutral – light – medium – pronounced
Flavour characteristics		e.g. raw material, processing, oak and maturation
Finish	length	short – medium – long
	nature	neutral – simple – some complexity – very complex
CONCLUSIONS		
Quality level		faulty – poor – acceptable – good – very good – outstanding

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Scotland

Production

- must be distilled and matured in Scotland
- must be aged for a minimum of 3 years in oak barrels
- age statement is age of youngest spirit in the bottle
- caramel colour can be used
- sugar may not be added

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Single Malt Whisky

overview

Location

- fermented and distilled in one distillery

Grains

- 100% malted barley

Distillation

- pot stills
- double distillation (typical)

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Peat

What is it?

- partly decayed vegetation

Using peat

- used as fuel during malting
- gives the malt a smoky flavour

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Still height

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Maturation

Main barrel types

- ex-American whiskey
- ex-Sherry
- distillers can choose what they use

Finishing

- various wines and spirits

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Labelling terms

single
age statement
wood finishing

cask strength
regional statement

non-chill-filtered
natural colour

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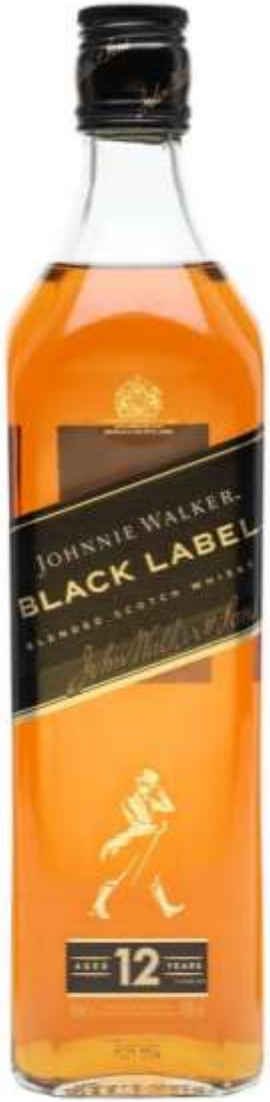
Blended Scotch Whisky



Single Grain Whisky

- fermented and distilled in one distillery
- malted barley with corn or wheat
- column distilled to a high strength

Production

- at least one Single Malt Whisky
- at least one Single Grain Whisky

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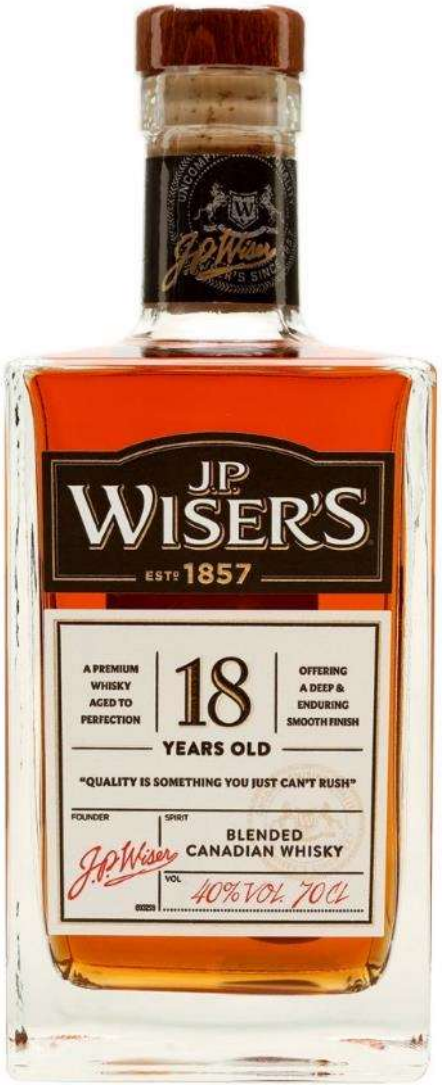
Canada



Grains

- rye, corn
- processed separately

Distillation

- base whisky (corn)
- flavouring whisky (rye)

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Ireland

Grains

- corn, wheat, barley (malted, unmalted)

Distillation

- pot and column
- triple pot still distillation

  lighter style, not required

Types

- Irish Blended Whiskey
- Irish Malt Whiskey
- Irish Pot Still Whiskey

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Japan

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APPEARANCE		
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